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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/650,121	08/28/2003	Olvi L. Mangasarian	1061-001US01	5513

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EXAMINER	
TRAN, MAI T	

ART UNIT	PAPER NUMBER
2129	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/650,121	MANGASARIAN ET AL.	
	Examiner	Art Unit	
	Mai T. Tran	2129	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 November 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-57* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-57* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *11/05/2007*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

REMARKS

Applicants' amendment dated November 26, 2007 responding to the August 3, 2007 Office Action provided in the rejection of claims 1-57, wherein claims 1, 3, 9, 16, 18, 24, 31, 33, 55, and 56 have been amended and no new claims have been added. Claims 1-57 remain pending in the application and which have been fully considered by the examiner.

The Examiner withdraws the objection to the specification for the minor informalities, corresponding to Applicants' amendment.

CLAIM REJECTIONS - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims **1-5 and 7-15** are rejected under 35 U.S.C. 103(a) as being unpatentable over "*A Newton Method for Linear Programming*", by O. L. Mangasarian, Data Mining Institute Technical Report 02-02, March 2002, hereinafter Mangasarian, in view of "*Data Selection for Support Vector Machine Classifiers*", by Glenn Fung et al, Data Mining Institute Technical Report 00-02, February 2000, hereinafter Fung, and further in view of "*Multiple Centrality Corrections in a Primal-Dual Method for Linear Programming*", by Jacek Gondzio, hereinafter Gondzio, 1996.

Claim 1

Mangasarian teaches a method comprising:

defining a linear programming formulation of a support vector machine classifier (page 13, lines 1-3, page 3, paragraph 2);

solving an exterior penalty function of a dual of the linear programming formulation to produce a solution to the support vector machine classifier (page 3, paragraph 2, page 4, lines 1-8); and

Mangasarian fails to teach select an input set for the support vector machine classifier.

Fung discloses Data Selection for Support Vector Machine classifiers (title).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine the method of Mangasarian with the data selection of Fung.

The motivation for doing so would be to have a classifier with improved testing set accuracy over a standard support vector machine (Fung, page 64, right col., lines 1-2).

Mangasarian in combination with Fung fails to teach a primal linear programming.

Gondzio discloses a primal-dual method for linear programming (title).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine the method of Mangasarian in combination with Fung with the primal linear programming of Gondzio.

The motivation for doing so would be to use a powerful tool for solving very large linear programs (Gondzio, page 1, paragraph 1).

Claim 2

Mangasarian teaches the method of claim 1, further comprising minimizing the exterior penalty function for a finite value of a penalty parameter (page 3, paragraph 2).

Claim 3

Mangasarian teaches the method of claim 1, wherein the linear programming formulation is a 1-norm linear programming formulation (page 2, last paragraph).

Claim 4

Mangasarian teaches the method of claim 1, wherein the solution is a least 2-norm solution (page 3, paragraph 2).

Claim 5

Mangasarian teaches the method of claim 1, wherein the support vector machine classifier is a linear support vector machine classifier (page 13, lines 4-6), and selecting an input set includes selecting a set of input features of the linear support vector machine classifier (Fung, page 64, abstract, lines 11-12).

Claim 7

Mangasarian teaches the method of claim 1, further comprising:

calculating a separating surface based on the selected input set and the support vector machine classifier (page 13, lines 1-18); and

classifying data using the separating surface (page 13, lines 1-18).

Claim 8

Mangasarian teaches the method of claim 7, further comprising classifying the data into two sets of data using the separating surface (page 13, lines 1-18).

Claim 9

Mangasarian teaches the method of claim 7, wherein the separating surface is one of an n-dimensional hyperplane or a nonlinear surface (page 13, lines 1-18. Examiner asserts the

separating surface is a hyperplane).

Claim 10

Mangasarian teaches the method of claim 1, further comprising applying a Newton-based algorithm to solve the exterior penalty function (title, page 6, paragraph 3).

Claim 11

Mangasarian teaches the method of claim 1, further comprising applying one or more linear constraints to the solution of the exterior penalty function (page 2, lines 19-21).

Claim 12

Mangasarian teaches the method of claim 1, wherein selecting an input set includes selecting a subset of input features from a larger set of input features that is substantially larger than the subset of input features (Fung, page 64, abstract).

Claim 13

Mangasarian teaches the method of claim 12, wherein the subset of input features includes less than approximately one percent of the larger set of input features (page 15).

Claim 14

Mangasarian teaches the method of claim 12, wherein the subset of input features includes less than approximately 0.1 percent of the larger set of input features (page 15).

Claim 15

Mangasarian teaches the method of claim 12, wherein the larger set of input features includes more than 20,000 input features, and the subset of input features includes less than ten input features (Fung, page 69).

Claims **6 and 46-48** are rejected under 35 U.S.C. 103(a) as being unpatentable over "*A Newton Method for Linear Programming*", by O. L. Mangasarian, Data Mining Institute Technical Report 02-02, March 2002, hereinafter Mangasarian, in view of "*Data Selection for Support Vector Machine Classifiers*", by Glenn Fung et al, Data Mining Institute Technical Report 00-02, February 2000, hereinafter Fung, in view of "*Finite Newton Method for Lagrangian Support Vector Machine Classification*", by Glen Fung et al, Data Mining Institute Technical Report 02-01, February 2002, hereinafter Fung2, and further in view of "*Multiple Centrality Corrections in a Primal-Dual Method for Linear Programming*", by Jacek Gondzio, hereinafter Gondzio, 1996.

Mangasarian in view of Fung teaches the method of claim 1 with the exception of a nonlinear support vector machine classifier.

Fung2 teaches Linear and Nonlinear kernel classification (page 3, paragraph 2).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine the method of Mangasarian in view of Fung with the linear and nonlinear kernel classification of Fung2.

The motivation for doing so would be a nonlinear classifier performs better than a linear classifier (Fung2, page 16, paragraph 5.2.2, line 3).

Mangasarian in view of Fung and Fung2 teaches the method of claim 1 with the exception of primal linear programming.

Gondzio discloses a primal-dual method for linear programming (title).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine the method of Mangasarian in combination with Fung with the primal linear programming of Gondzio.

The motivation for doing so would be to use a powerful tool for solving very large linear programs (Gondzio, page 1, paragraph 1).

Claim 6

The method of claim 1, wherein the support vector machine classifier is a nonlinear support vector machine classifier (Fung2, page 5, line 16), and selecting an input set includes selecting a set of kernel functions for the nonlinear support vector machine classifier (Fung, title).

Claim 46

The method of claim 1, further comprising applying the support vector machine classifier to classify data relating to one of fraud detection, credit evaluation, gene expression, intrusion detection, medical diagnosis or medical prognosis (Fung2, page 13, paragraph 5.1, 5.1.1).

Claim 47

The method of claim 1, further comprising applying the support vector machine classifier to classify data relating to multiple myeloma (Fung2, page 13, paragraph 5.1).

Claim 48

The method of claim 1, further comprising applying the support vector machine classifier to classify data relating to absolute call measurements for multiple myeloma (Fung2, page 13, paragraph 5.1.1).

Claims 16-20, 22-30 and 55-56

This is a system version of the claimed method discussed above, in claims 1-5 and 7-15, wherein all claimed limitations have also been addressed and/or cited as set forth above.

Claims 21, 49-51 and 57

This is a system version of the claimed method discussed above, in claims 6 and 46-48, wherein all claimed limitations have also been addressed and/or cited as set forth above.

Claims 31-35 and 37-45

This is a software version of the claimed method discussed above, in claims 1-5 and 7-15, wherein all claimed limitations have also been addressed and/or cited as set forth above.

Claims 36 and 52-54

This is a software version of the claimed method discussed above, in claims 6 and 46-48, wherein all claimed limitations have also been addressed and/or cited as set forth above.

RESPONSE TO ARGUMENTS

Rejection of claims 1-57 under 35 U.S.C. § 103(a):

Applicants' arguments with respect to claims 1-57 have been considered but are moot in view of the new ground(s) of rejection.

CONCLUSION

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

M.T.T
Patent Examiner

David Vincent 2/4/08
Supervisory Patent Examiner
Tech Center 2100